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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/139,935

08/25/1998

FWU-IUAN HSHIEH

2154-11

5942

7590

01/14/2005

KAM T TAM
3077 PAVAN DRIVE
SAN JOSE, CA 95148

EXAMINER

NADAV, ORI

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 01/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	09/139,935	HSHIEH, FWU-IUAN	
	Examiner	Art Unit	
	ori nadav	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 and 21-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 32 and 33 is/are allowed.
- 6) ☒ Claim(s) 1-19 and 21-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-19 and 21-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda et al. (5,770,514).

Matsuda et al. teach in figure 3 and related text the entire claimed structure including a semiconductor structure comprising: a substrate 11 having a major surface,

at least one trench in the substrate includes inner surfaces filled with conductive material 17 comprising polysilicon, electrically separated from the substrate by insulating material 16,

a first insulating layer disposed on the major surface above the trench and having a first contact opening,

a first conductive layer 24 comprising aluminum disposed above the first insulating layer and in contact with the conductive material in the trench through the first contact opening, said first conductive layer having conductivity higher than the conductivity of said conductive material;

a second insulating layer 25 disposed above the first conductive layer and having a second contact opening, and

a second conductive layer 23 disposed in the second insulating layer 25 and in contact with the substrate through the second contact opening,

a source layer, a drain and a gate includes the trench.

Matsuda et al. do not teach a second conductive layer disposed above the second insulating layer. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form a second conductive layer above the second insulating layer in order to operate the device by providing external connections to the device. Note that the device would not operate without external connections.

Regarding claims 4, 24 and 30, Matsuda et al. teach second conductive layer being substantially rectangular in shape and having no elongated voids extended therein.

Regarding claims 5, 6, 25 and 29, Matsuda et al. teach a first insulating layer comprising silicon dioxide. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form a second insulating layer comprising BPSG in Matsuda et al.'s device in order to provide better protection for the device.

Regarding claims 7-12, 19, 22, 23, 26, 29 and 31, Matsuda et al. teach a conductive layer comprising metal and a gate material inside the trench comprising polysilicon.

Regarding claim 14, Matsuda et al. teach a trench being a elongated in shape.

Claims 15-19 and 21-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda et al. in view of Blanchard (5,034,785).

Matsuda et al. teach substantially the entire claimed structure, as applied to claim 1 above, except stating that the trenches are formed in first and second directions.

Blanchard teaches in figure 9 trenches formed in first and second directions. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form trenches in first and second directions in Matsuda et al.'s device, because the layout of a circuit is a matter of design choice within ordinary skill in the art, subject to routine experimentation and optimization to find the most efficient layout for the circuit.

Allowable Subject Matter

Claims 32 and 33 are allowable.

Response to Arguments

Applicant's arguments with respect to claims 1-19 and 21-31 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is (571) 272-1660. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

Art Unit: 2811

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308-0956**

A handwritten signature in black ink, appearing to read 'Ori Nadav', with a stylized flourish at the end.

O.N.
1/11/05

ORI NADAV
PRIMARY EXAMINER
TECHNOLOGY CENTER 2800